

SIEMENS

MAMMOMAT 300 / 3000

SP

Repair Instructions

Replacing the cable harness

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Systems affected

MAMMOMAT 300/ 300 CE
MAMMOMAT 3000/ 3000 CE

Documents required

- MAMMOMAT 300/ 3000 Wiring diagram
- MAMMOMAT 300/ 3000 Installation and Start-Up Instructions

Tools and measurement devices required

- Standard service kit
- Screw clamp
- Protective conductor meter (item no.: 44 15 899 RVO90)
- Oscilloscope
- Digital multimeter (incl. mAs meter)
- Plexiglas plates for testing Iontomat
- 12 V battery

Parts required

- Cable harness, item no.: 61 64 037 X041E for MAM. 300 through ser.no. 1999
- Cable harness, item no.: 63 41 650 X041E for MAM. 300 CE starting at ser.no. 4000
- Cable harness, item no.: 62 40 175 X041E for MAM. 3000 through ser.no. 02999
- Cable harness, item no.: 64 51 350 X041E for MAM. 3000 CE starting at ser.no. 03000

Time required

1 service engineers / approx. 16 hours or
2 service engineers / approx. 12 hours each

NOTICE

If the MAMMOMAT 300/3000 has not been updated with the outlet for the corrugated tubing, perform the update in accordance with UI 41/95.

Differences between MAMMOMAT 300 / MAMMOMAT 3000

This document describes the replacement of the cable harness for MAMMOMAT 3000 (CE).

Instructions are included concerning service work on MAMMOMAT 300 that differs significantly from work done on Mammomat 3000.

Work performed on the Mammomat 300 may still deviate slightly from these instructions.

Safety information

Checks or adjustments performed with radiation ON, are identified with this symbol:



95040219

Fig.1 X-ray warning symbol

Prior to performing any service work with the system open, disconnect it from the power line supply using the main circuit breaker. Always disconnect the system from the line voltage prior to removing or inserting a board. Adjust switch S2 (SS) on board D702 to "OFF" (lower position) to prevent any unintended release of high voltage and/or radiation (disables the SS relay).

WARNING

If the system has been switched off only at the control console or with switch S2/D711, line voltage is still present at the line connection for the generator, at line filters Z1, Z2, at transformer T1, and at transformer T10 on board D711 (refer to circuit diagram).

WARNING

After switching the system off, approximately 380V DC is present in the intermediate circuit. This is indicated by LED V24 on board D710. Within 3 minutes, the voltage will drop to less than 30 volts and the LED will go out.

CAUTION

The boards contain components that are very sensitive to electrostatic discharge. They must be handled with care. (Observe ESD guidelines).

WARNING

The metal band on the front of the stand has sharp edges which can cause injury. When removing the side covers, the edge protection strips must be attached as a safety precaution. Remove the edge protection strips only when you have reattached the side covers or if a height adjustment is necessary.

Removing the stand covers

The MAMMOMAT 3000 stand covers exist in two versions:

- one with separate rear side covers
- one with a single rear cover that also covers the rear sides

MAMMOMAT stand with separate rear side covers

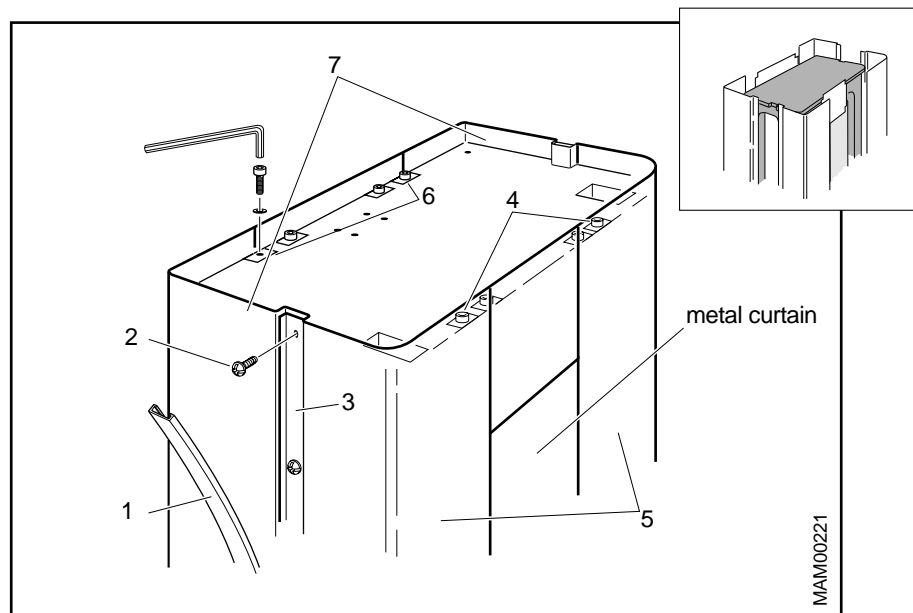


Fig. 1 MAMMOMAT with separate rear side covers

CAUTION

The metal curtain (see Fig. 1) is very sharp. After removing the stand front covers (5), mount protective strips onto the edges of the metal curtain. The strips are located inside the stand.

- Elevate swivel-arm system to a comfortable working height.
- System OFF.
- Remove plastic strip (1).
- Remove screws (2) and inner plastic strip (3).
- Remove screws (4) and front covers (5).
- Remove screws (6) and rear side covers (7).

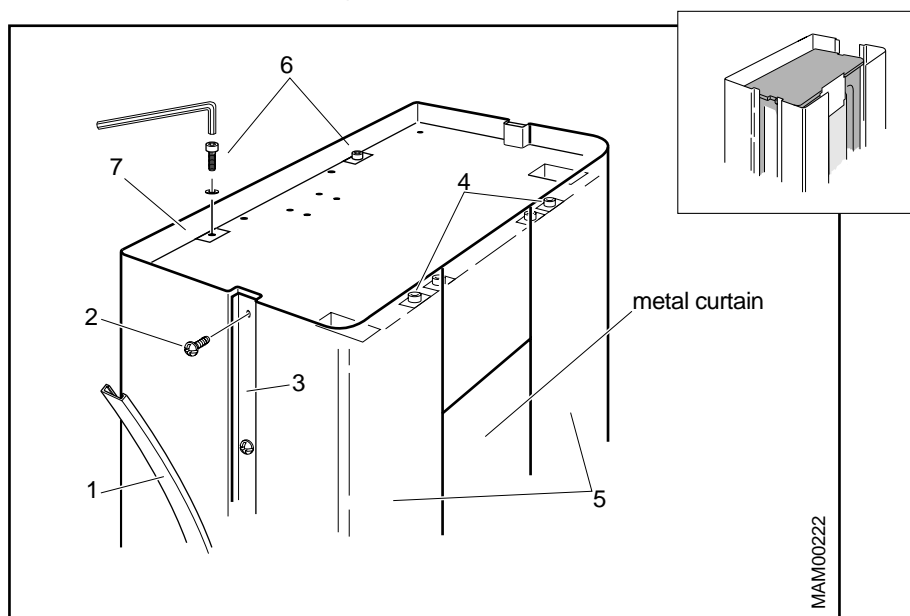
MAMMOMAT with single rear cover

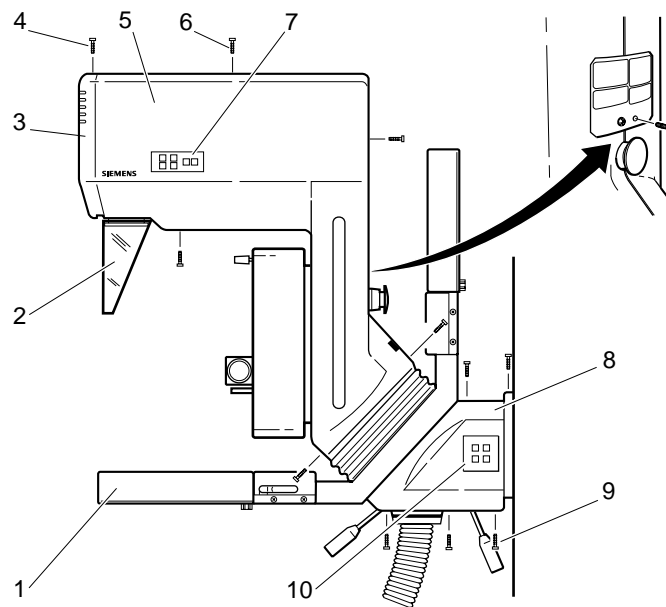
Fig. 2 MAMMOMAT with single rear cover

CAUTION

The metal curtain (see Fig. 2) is very sharp. After removing the stand front covers (5), mount protective strips onto the edges of the metal curtain. The strips are located inside the stand.

- Elevate swivel-arm system to a comfortable working height.
- System OFF.
- Remove plastic strip (1).
- Remove screws (2) and inner plastic strip (3).
- Remove screws (6) and rear cover (7).
- Remove screws (4) and front covers (5).

Removing the swivel arm cover



MAN00223

Fig. 3 Removing the swivel arm cover

- Remove object table (1).
- Remove face shield (2) by sliding it off its holder.
- Remove front cover (3) by removing two screws (4).
- Remove side covers (5) by removing twelve screws (6) and disconnecting the two connectors X807, connected to tube head control panel (7), and the two ground cables.
- Remove the shaft covers (8) by removing ten screws (9) and disconnecting the two connectors X808, connected to control panel (10) inside the shaft cover.

CAUTION

Be careful not to damage connectors X807 and X808 when removing the covers.

Removing the compression unit

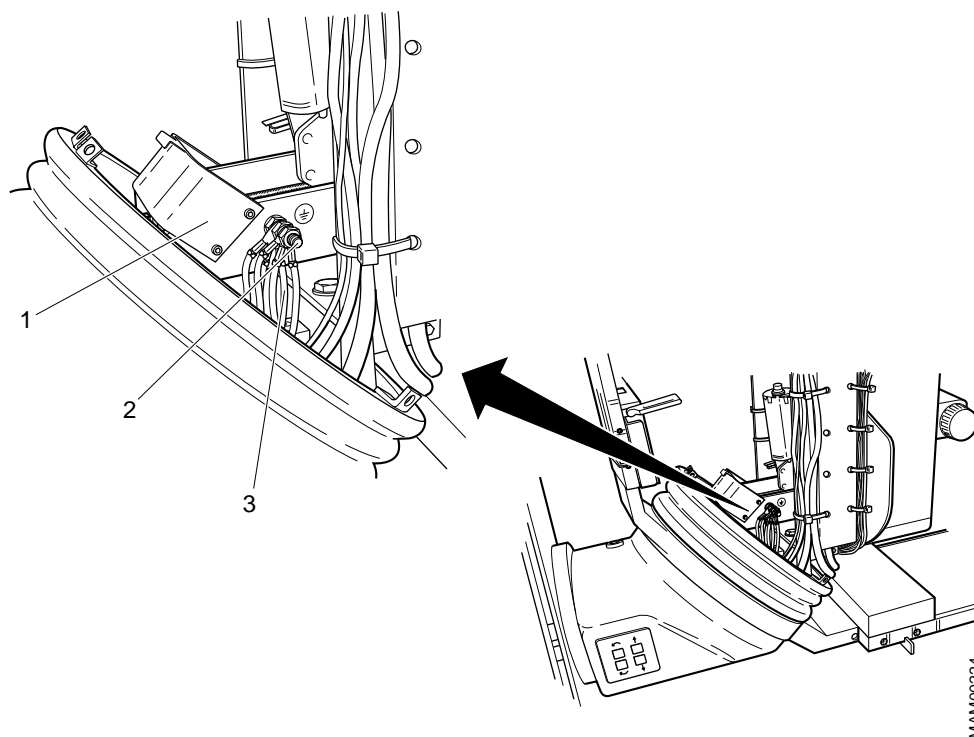
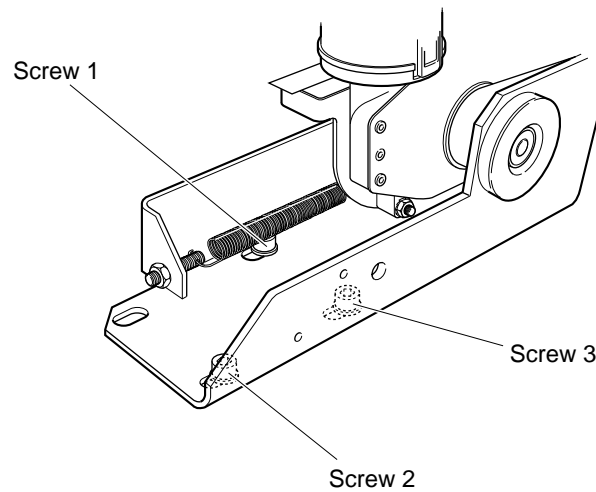


Fig. 4 Position of the protective conductors and the cable guide

- Remove cable guide (1).
- Remove earth screw (2) and ground cables (3).



MAM000225

Fig. 5 Removal of compression unit

NOTICE

Before removing the compression unit it is essential to mark up the position of the base beam of the compression unit. This is to ensure proper alignment when remounting the compression unit.

- Loosen and remove screws and washers 1 and 2 that hold the compression unit base beam (see Fig. 5).
- Loosen screw 3 by half to tilt the compression unit slightly forward.
- Pull connector X872 out of printed circuit board D805.
- Pull out connectors X873 and X874, which are located behind the compression unit.
- Loosen and remove screw 3, and remove the compression unit.

Removing other components

- Remove the connection wires for the fan.
- Remove the 4 screws (1/Fig. 6) and remove the fan unit (2/Fig. 6).

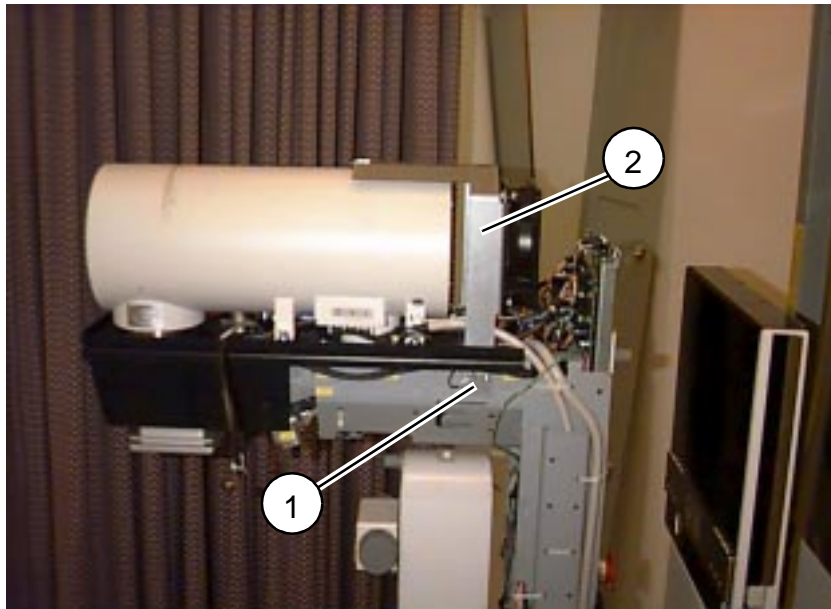
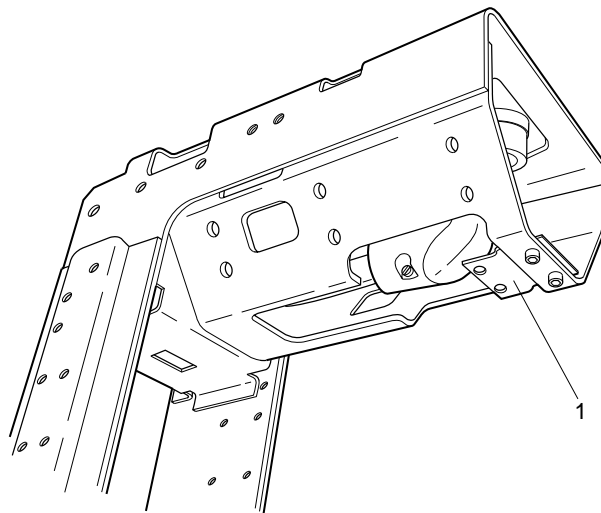


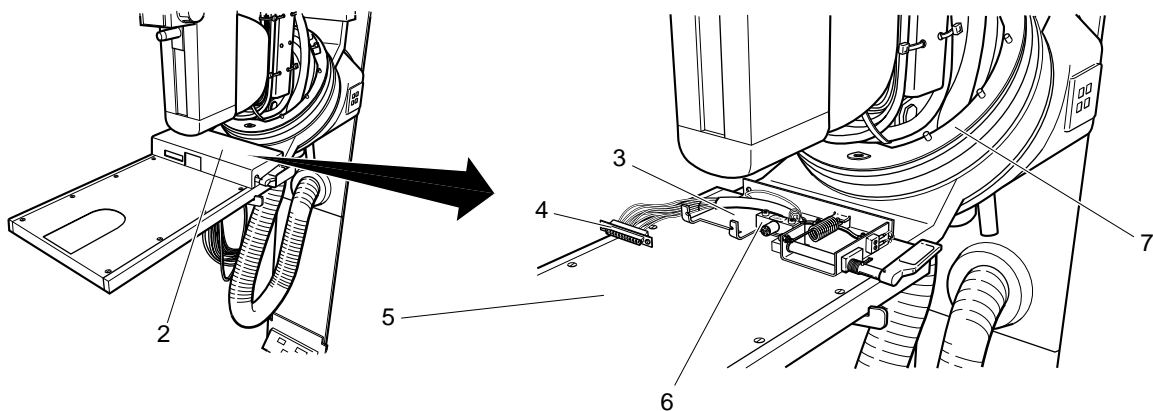
Fig. 6 Removal of fan unit



MAMM00226

Fig. 7 Position of the anchor plate

- Remove the anchor plate by removing the screws (1/Fig. 7).



MAMM00227

Fig. 8 Components on object table

MAMMOMAT 3000 / MAMMOMAT 3000 CE only

Perform the following work on the table support for WING 1:

- Remove cover (2/Fig. 8) by removing two screws on the back.
- Remove the screws holding the connector X893 (4/Fig. 8). Mark the top of the connector.
- Remove the screws holding the connector X891 (6/Fig. 8). Mark the top of the connector.
- Remove the screws holding the assembly plate (3/Fig. 8).
- Remove the table support cover (5/Fig. 8).
- Loosen bellow (7/Fig. 8) by removing plastic guide blocks inside the bellow.

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Remove the connectors at the MAMMOMAT 300/300 CE swivel arm

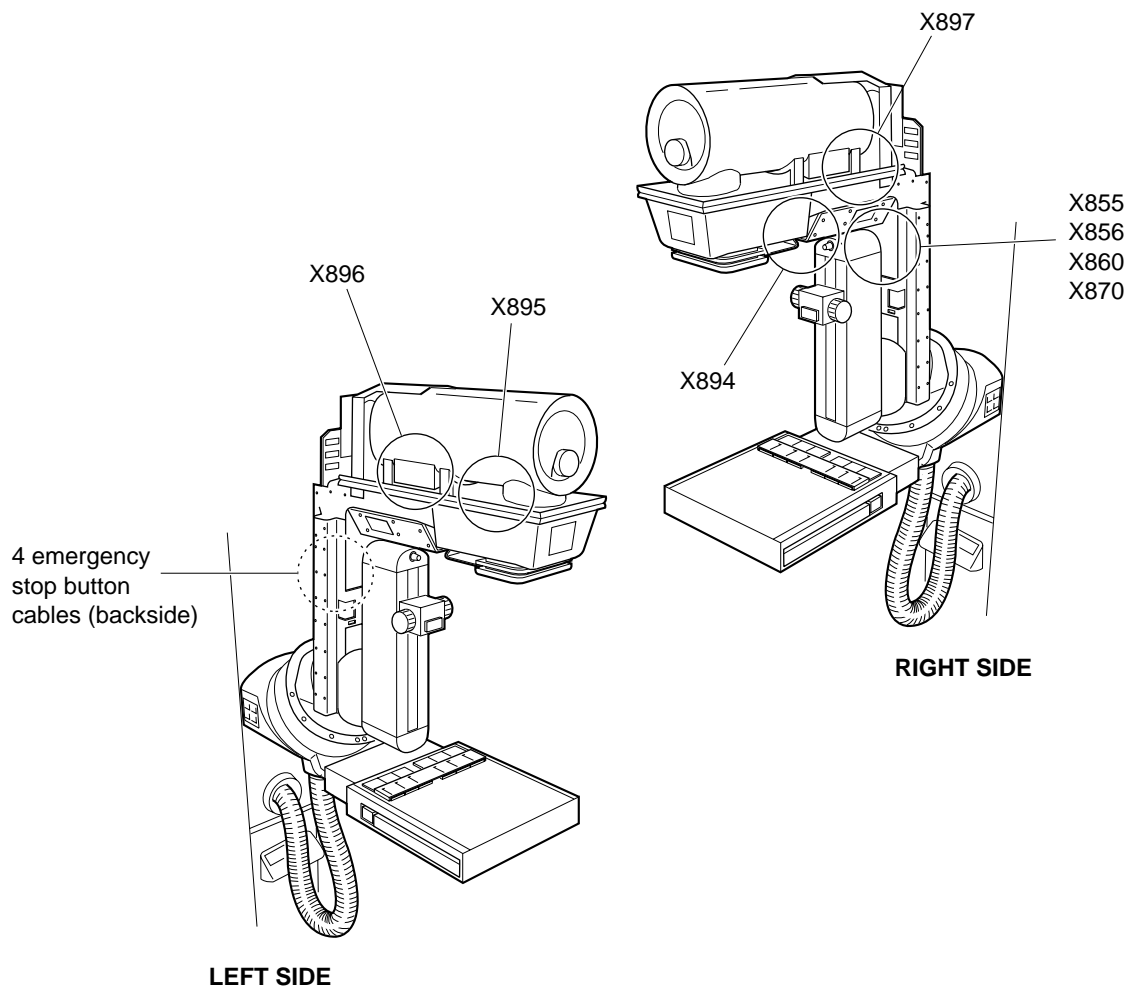
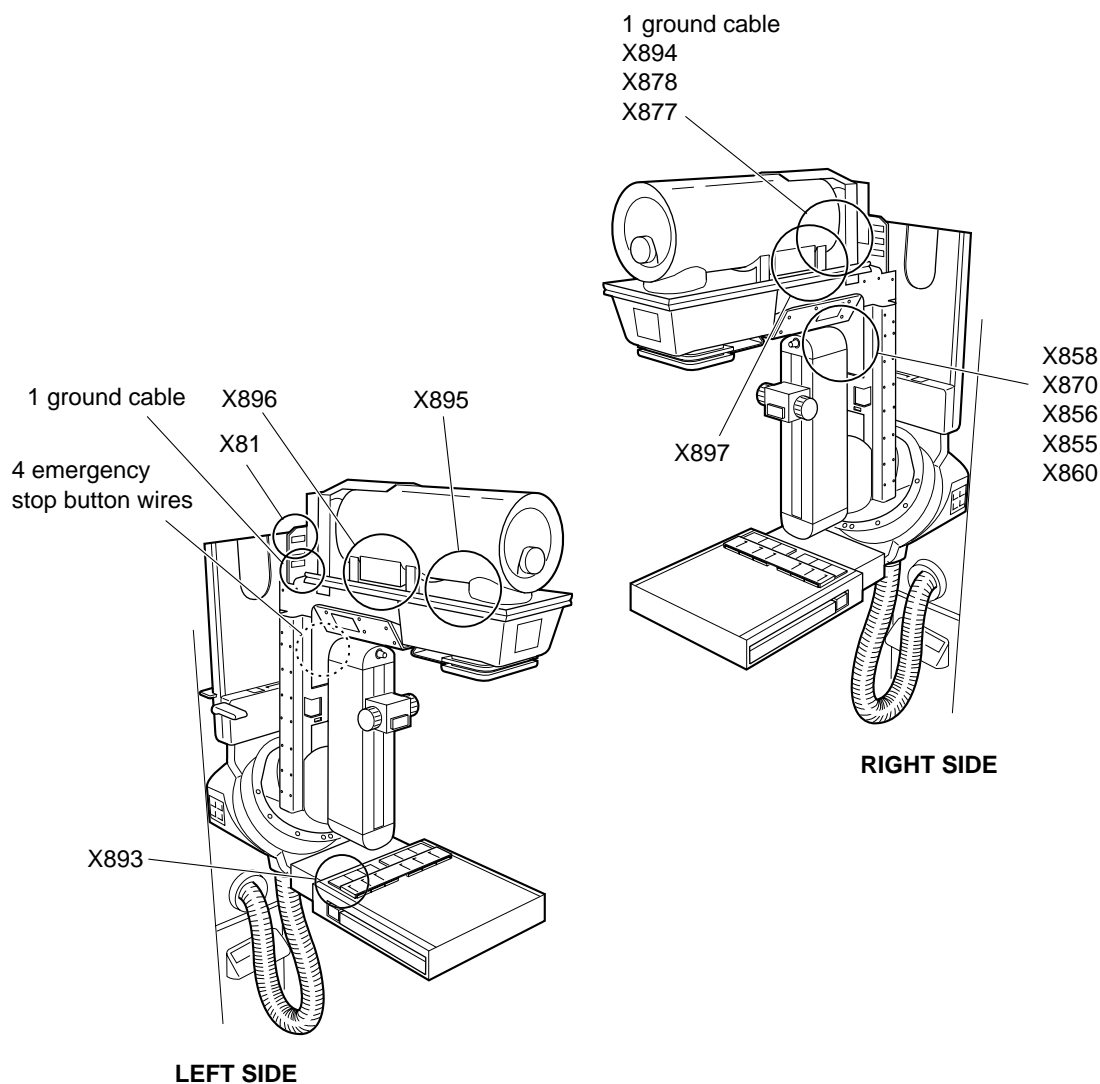


Fig. 1

- Remove all connectors in accordance with Fig. 1 and the list which follows (including the protective conductors).
The cables highlighted in gray have already been removed.
- Remove the four wires from the STOP switch.

Remove the connectors at the MAMMOMAT 3000/3000 CE swivel arm



MAM00228

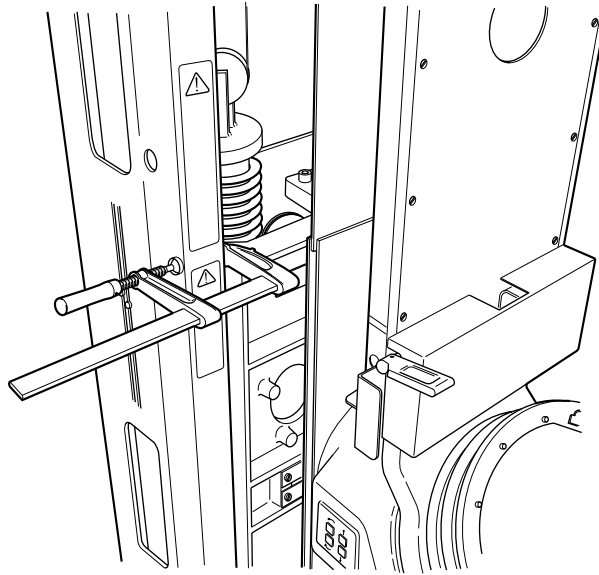
Fig. 2

- Remove all connectors in accordance with and the following list (including the protective conductors).
The cables highlighted in gray have already been removed.
- Eject wire #2 from connector X860.
- Remove the four wires from the STOP switch.
- Remove the wire with connector X893.

Connector	approximate position
X895	front of the X-ray tube
X896	7 individual wires, 6 to the X-ray tube (left side) and 1 protective conductor at the collimator.
X894	below the fan
X878 *1	below the fan
X877 *1	below the fan
X897	4 individual wires, 3 at the X-ray tube (right side) and 1 protective conductor at the collimator.
X858 *1	on the front of D805 covered by insulating tubing
X870	on the front of D805 (covered by insulating tubing *1)
X856	on board D805
X855	on board D805
X860	on board D805 (eject wire "2" from the connector)
4 STOP switch connection wires	on the STOP switch
X893 *1	Stereotactic - connection plug on the table support
2 protective conductors	1 on the X-ray tube (close to the chest wall) and 1 on the swivel arm frame
X872, X873	on board D805
X873	between board D805 and the compression unit
X874	between board D805 and the compression unit
5 protective conductors	swivel arm frame
2 fan connection wires	on the fan

*1 MAMMOMAT 3000/ 3000 CE only

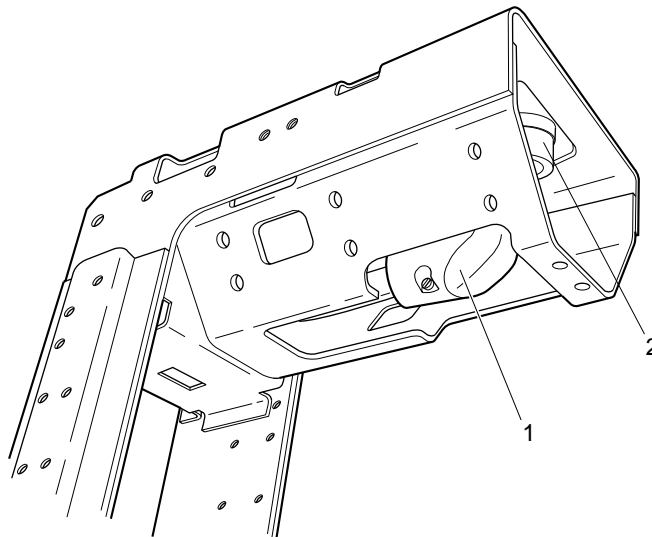
All Mammomats: Removing the high voltage cable



MAM00229

Fig. 3

- To prevent uncontrolled vertical movement of the lifting carriage, the screw clamp must be attached as shown in Fig.3 before removing the X-ray tube.



MAM00230

Fig. 4

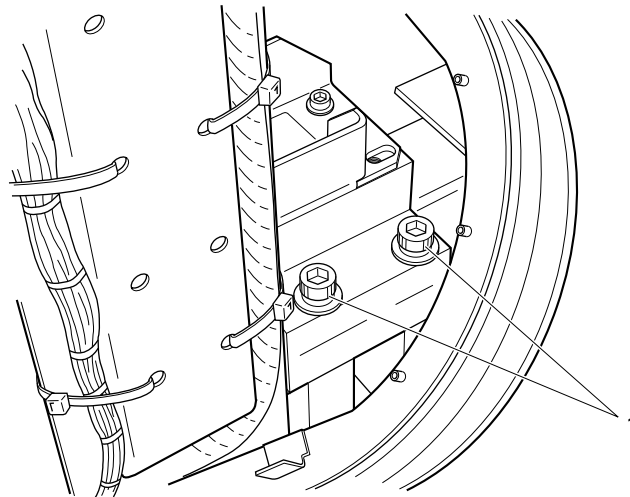
CAUTION

The lifting carriage is counterbalanced. If the X-ray tube is removed without securing the lifting carriage, the carriage may move upward suddenly causing damage and/or injury.

- Remove the 4 mounting screws of the X-ray tube.
- Lift up the X-ray tube and remove the high voltage cable (1) by unscrewing the sleeve nut (2).
- Secure the X-ray tube again with the mounting screws.

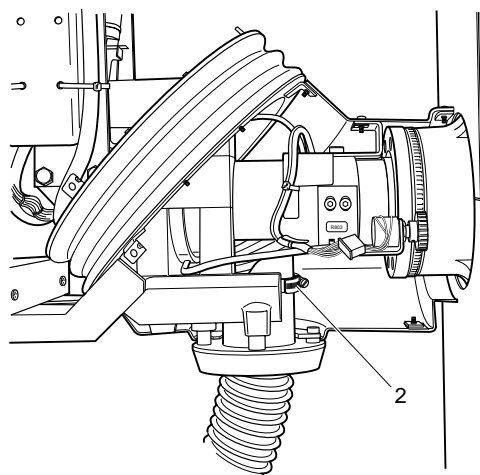
- Mark the position of the cable (Position with reference to the stand, position of the cable ties).
- Remove the component parts of the high voltage cable plug.
- Cut the cable ties from the cable harnesses being removed.
- Remove the cable from the swivel arm.

MAMMOMAT 300/300 CE only - Removing the corrugated hose



MAM00238

Fig. 5



MAM00239

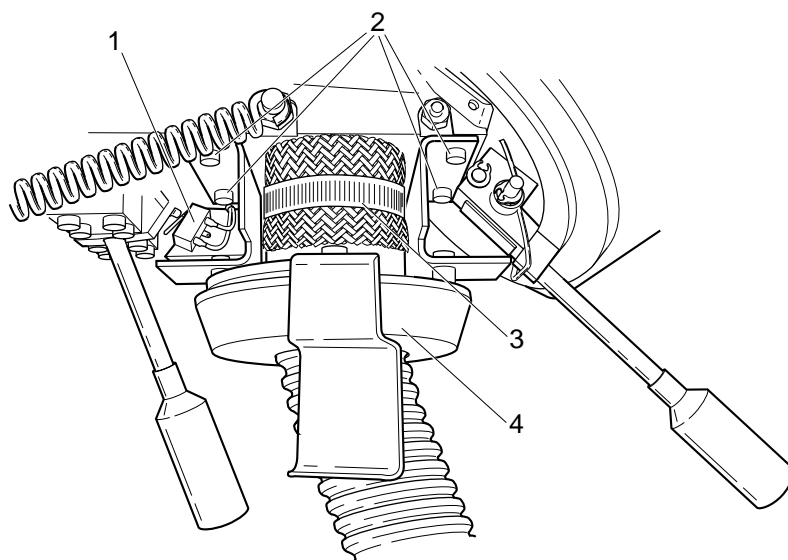
Fig. 6

- Remove the 4 screws (1);
the table support can then be lowered by approximately 1 cm.
- Remove the clamp (2).

NOTICE

for MAMMOMAT 300 CE:

- The braided grounding wire should remain attached to the swivel arm.
- Unfold the shielding and remove the semicircular cable clamp.

MAMMOMAT 3000/ 3000CE only - Removing the corrugated hose

MAM00218

Fig. 7

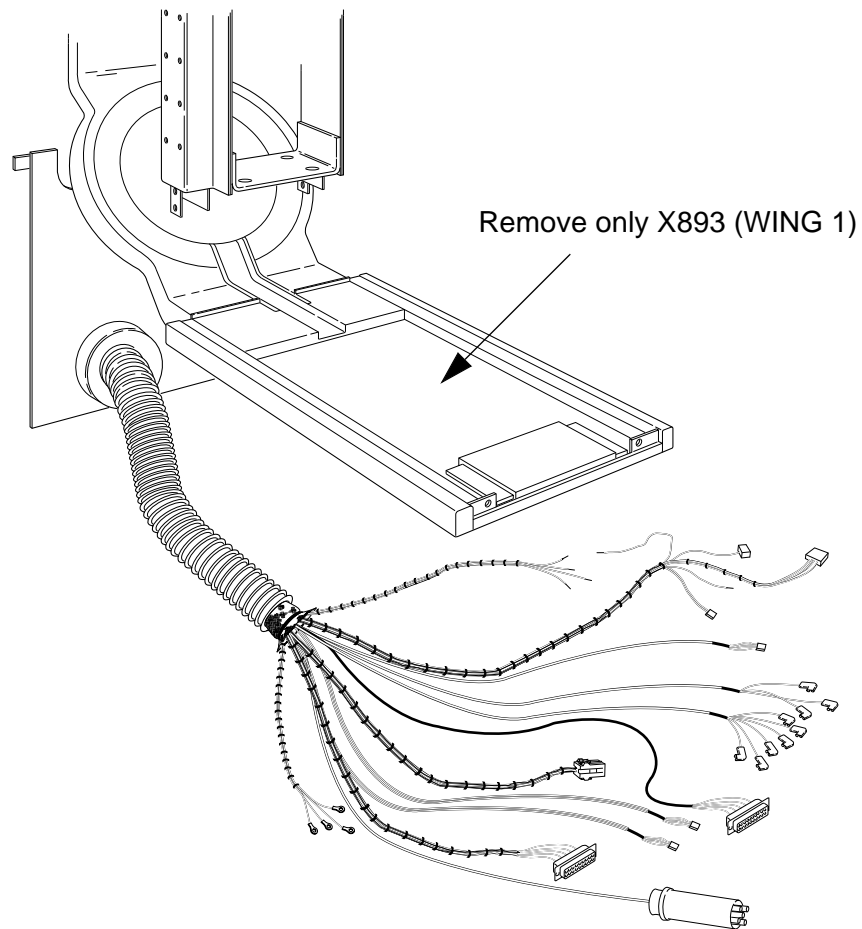
- Remove the stereo switch (1).
- Remove the 4 screws (2) and remove the lead-through ring (4).
- Remove the hose clamp (3).

NOTICE**for MAMMOMAT 3000 CE:**

- The braided grounding wire should remain attached to the swivel arm.
- Unfold the shielding and remove the semicircular cable clamp.

- Pull the lead-through ring off the cable harness.

All Mammomats: additional disassembly work



MAM00219

Fig. 8

- Pull all cables out of the swivel arm as shown in Fig. 8.

All Mammomats: Removing the cable harness from the left side of the stand

NOTICE

for MAMMOMAT 300/ MAMMOMAT 300 CE:
Some of the connectors below are omitted

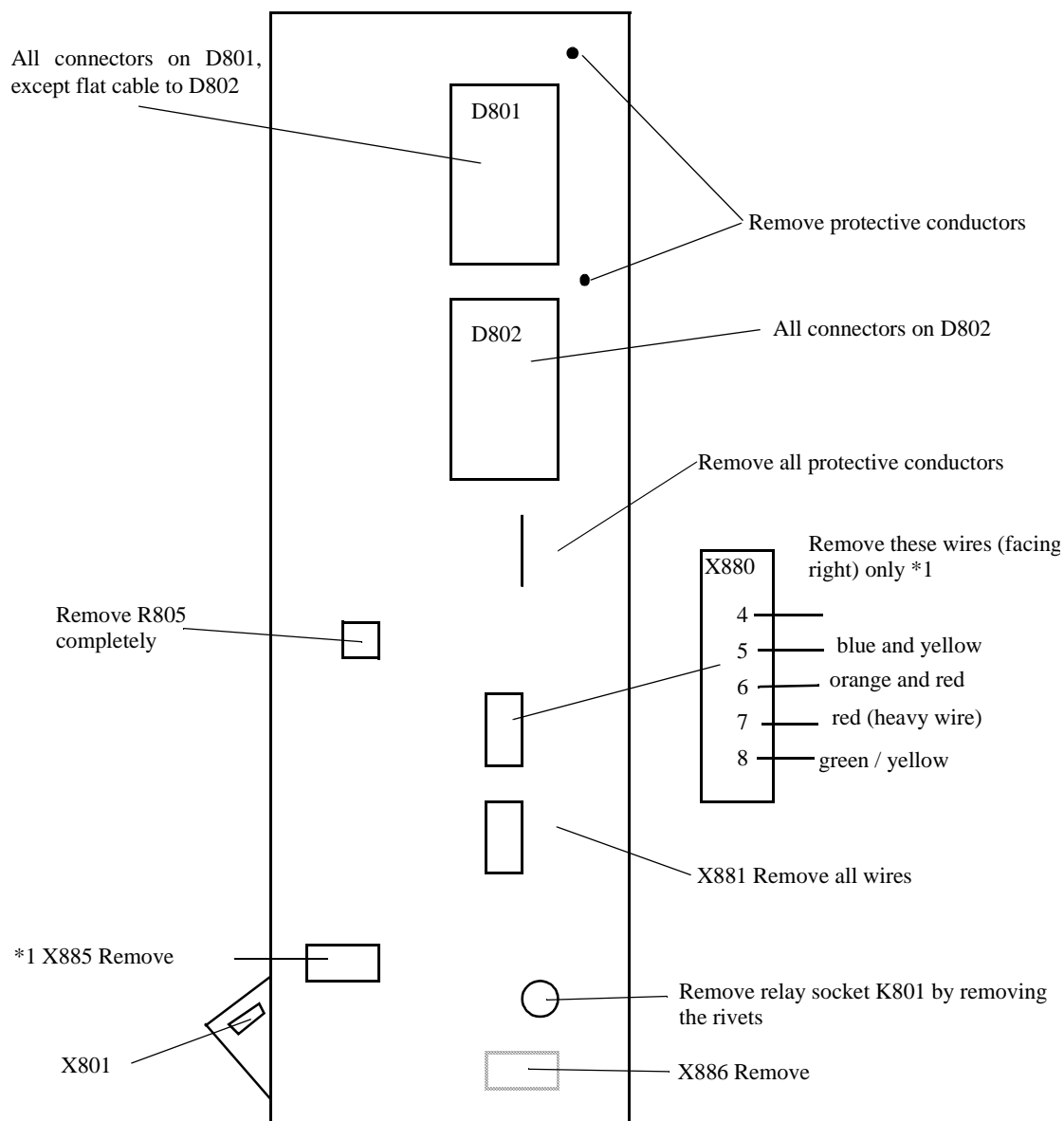


Fig. 9

*1 MAMMOMAT 3000 CE: Connectors X885 and X880 are omitted

On the left side of the stand remove:

- All connectors on board D801 (except for the connection cable to D802).
- All connectors on board D802
- Protective conductors above D801 and D802 as well as at the protective conductor bar.
- Resistor assembly R805 (remove the screws, do not desolder).
- Wires according to Fig. *1 at connector X880 .
- Remove all wires at connector X881.
- Remove relay K801 and remove the socket (cut the rivets).
- Remove connector X885 by removing the screws*1.
- Remove connector X801 on display board D803 (front of the stand).
- Remove connector X886 (inside the stand) *1.

*1 omit for MAMMOMAT 3000 CE.

MAMMOMAT 3000 CE only

- Remove connector X802 in the base of the stand (transformer T802).

All Mammomats: Disconnecting the cable harness at the back wall of the stand

NOTICE

For MAMMOMAT 300/ MAMMOMAT 300 CE:
Some of the connectors below are omitted.

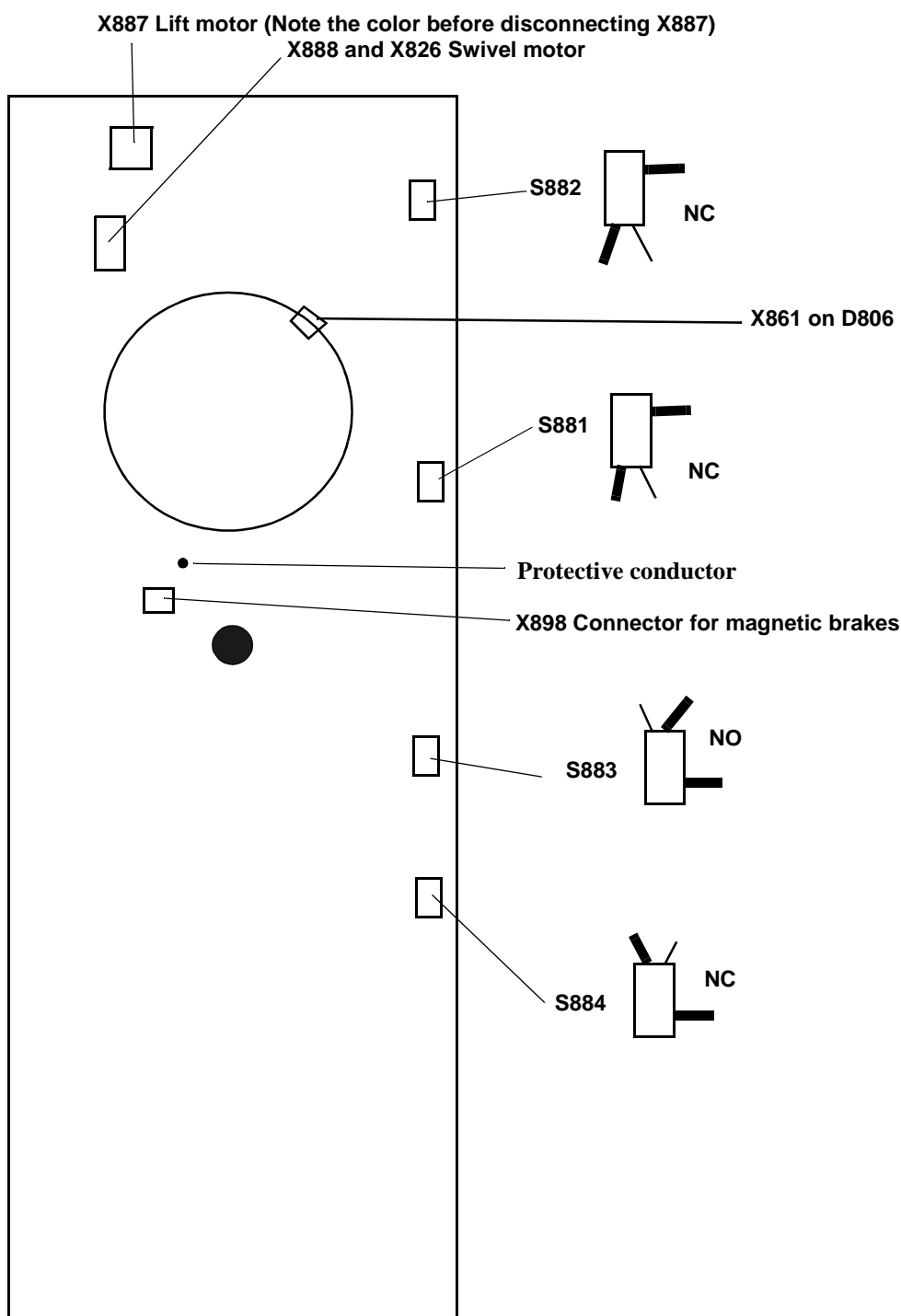


Fig. 10

Removing the connectors on the left side of the stand

- X887 Lift motor.
- X888 and X826 Swivel motor.
- X861 Angle detector board.
- X898 Rotation brake.
- Protective conductor.
- Microswitches: S882, S881, S 883, S884.

NOTICE

For some stand versions, the swivel motor must be removed (1/Fig.11):

- Insert the transport screw for the rotation counterbalance, refer to (1/Fig. 11).
- Remove the 3 screws show in (2/Fig. 11) and remove the swivel motor (3/Fig. 11).

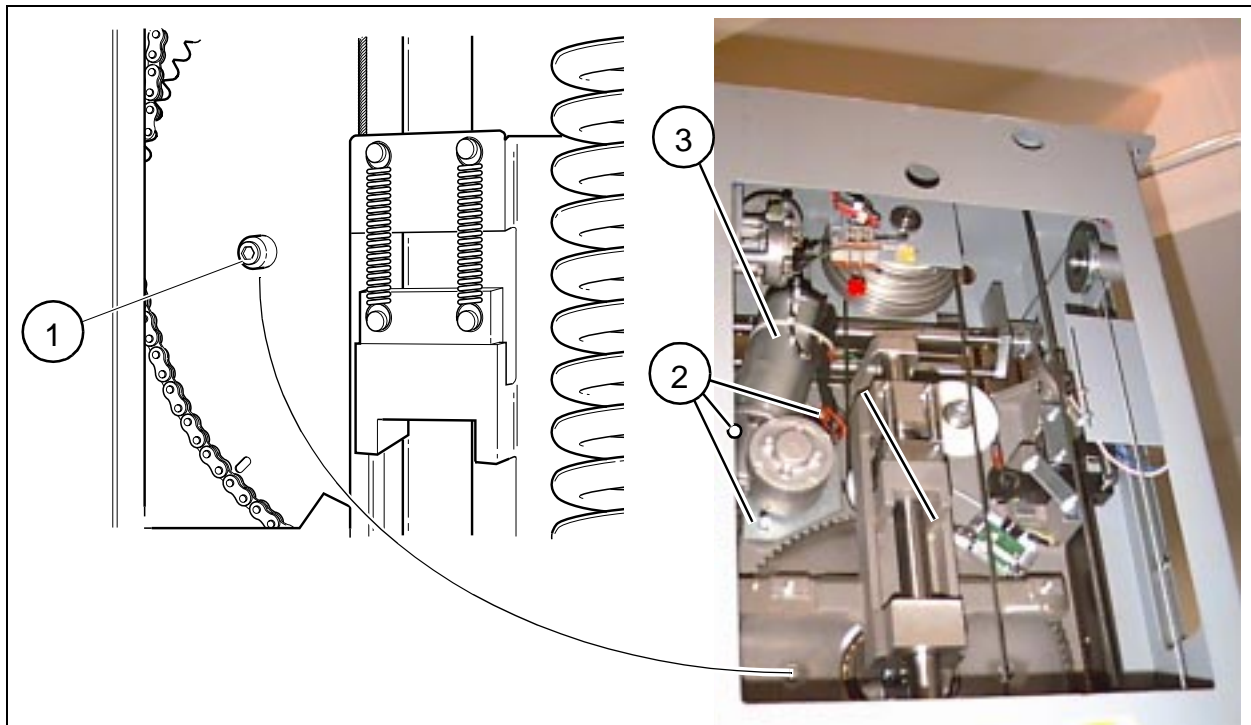


Fig. 11

MAMMOMAT 300 CE and MAMMOMAT 3000 CE only

Remove the screws from the connection device (1/Fig. 12) on the base of the stand and disconnect the following connectors:

- X885 connection cable for the stereo evaluation unit.
- Connector X885.
- Wire to line filter Z801.
- Protective conductor.
- Wire on connector X803 (back).
- Strain relief for all wires to the generator.

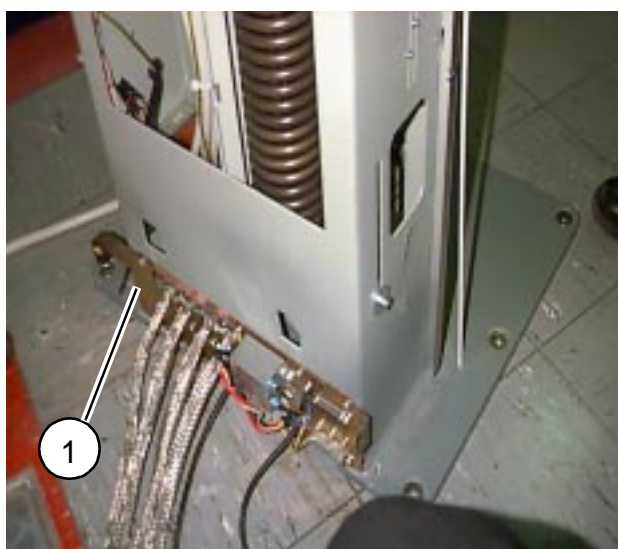
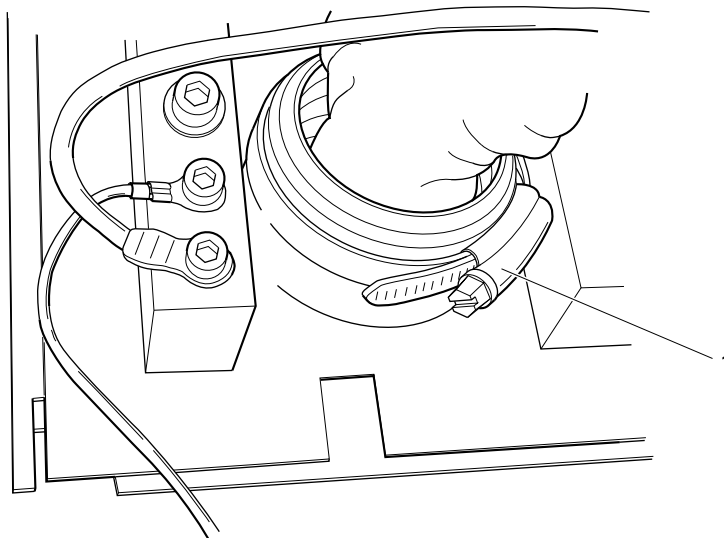


Fig. 12

Removing the cable harness from the stand



MAM00231

Fig. 13

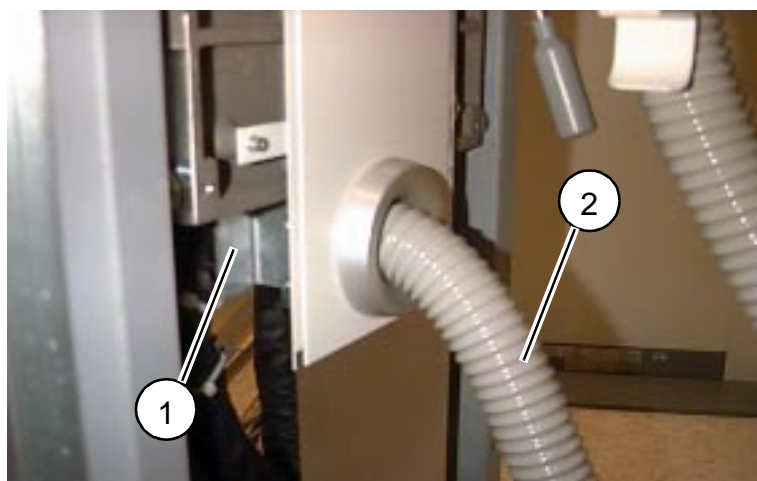


Fig. 14

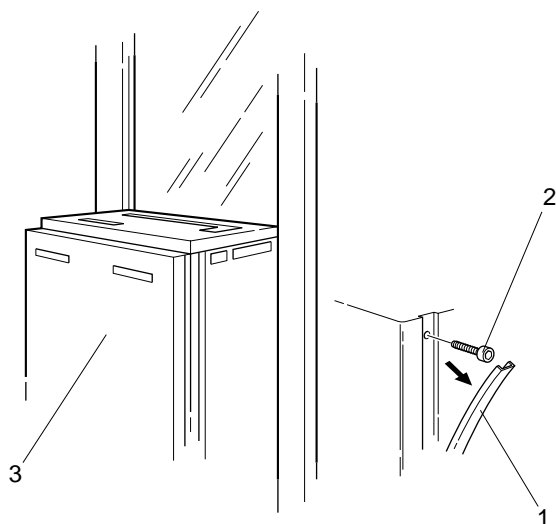
- Loosen the hose clamp (1/Fig.13) for the corrugated hose on the lifting carriage.f

NOTICE

for MAMMOMAT 300 CE and MAMMOMAT 3000 CE

The braided grounding wire remains attached to the lifting carriage.

- Remove the angle bracket (1/Fig.14) for the corrugated hose.
- Pull the corrugated hose (2/Fig.14) into the lifting carriage.



MAM00131

Fig. 15

Removing the cable harness at the generator

- Remove the front cover (3/Fig.15) of the generator.

Remove the following connectors at the generator according to the installation instructions:

- High voltage cable.
- X9 Rotating anode.
- X14 Power supply for the stand.
- X8 Filament.
- X1 Serial interface.
- X10, X11 Iontomat cable.
- Protective conductor.

Pull back all cables that lead from the generator to the base of the stand.

MAMMOMAT 300 / MAMMOMAT 3000 only



Fig. 16

- Remove the cable bracket (1/Fig.16) from the base of the stand.

All Mammomats

- Withdraw the generator cable into the stand.
- Remove the cable harness.

Rerouting the wires

- If the system is equipped with a stereotactic biopsy attachment, it will be necessary to remove the 3-conductor cable connecting X809 to X885 from the old harness and add it to the new harness (for harness 62 40 175).
- The conductors at X885 are connected as follows:

1	white
7	brown
13	green

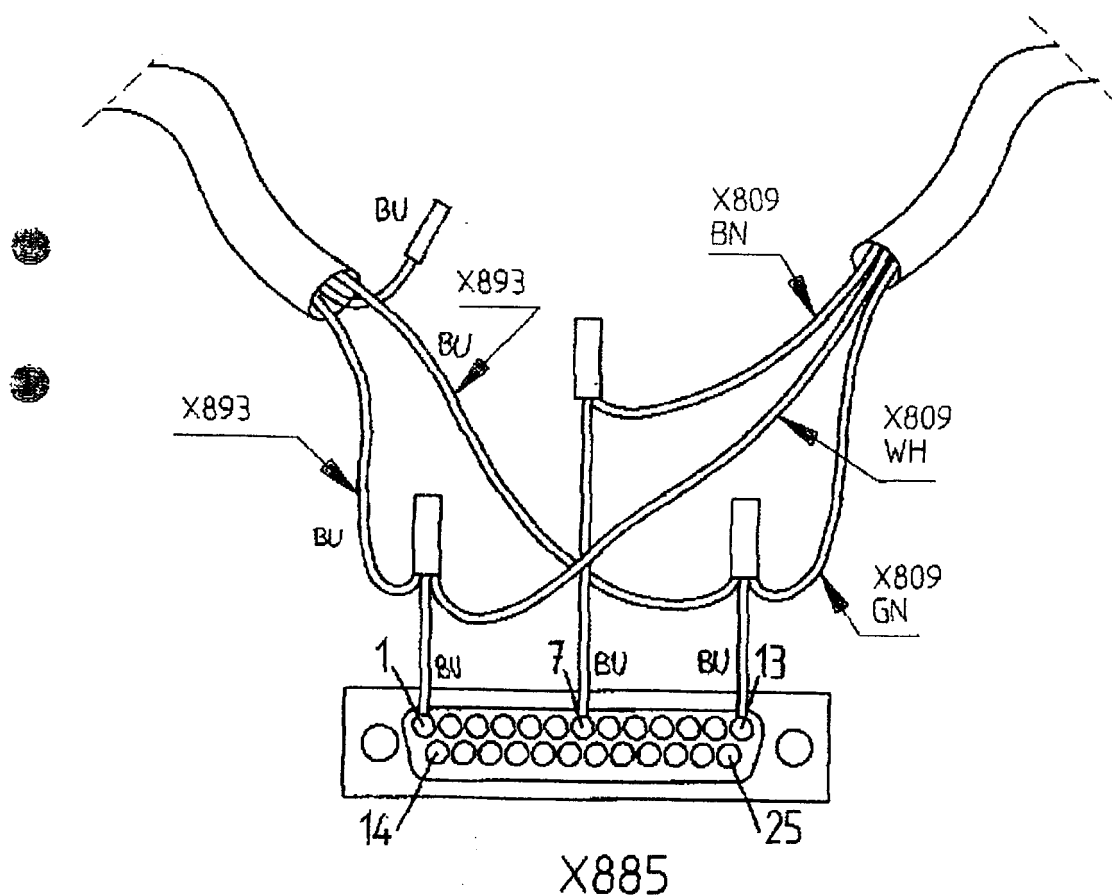


Fig. 17

Routing the cable harness

- Insert the cable harness as shown in (1) Fig. 1 in the back of the stand.

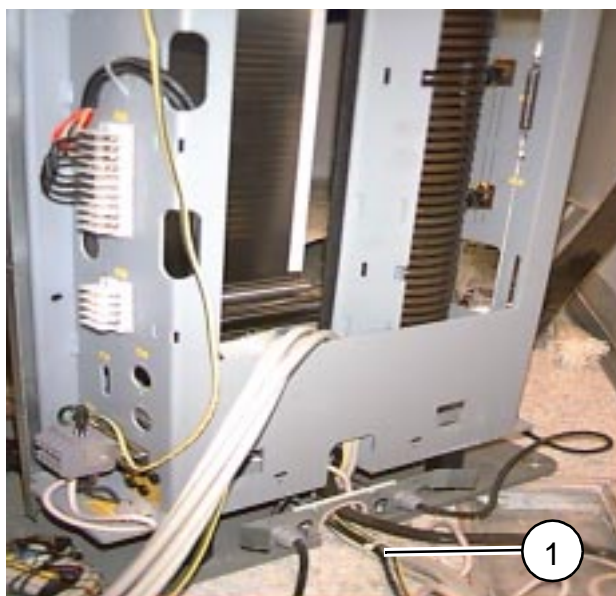


Fig. 1

- Route the cable (1/Fig. 1) to the generator and connect it as described in the installation instructions.
- Route the cable (2/Fig. 2) in the lower part of the stand and secure it with cable ties.



Fig. 2

Divide the cable harness in the stand, route the branches and secure with cable ties:

- Pull the branch with the corrugated tubing through the tube to the front of the stand.
- Route the branch with relay socket K801 etc. to the lower left.
- Route the branch with the connectors for D801 etc. to the upper left.
- Route the branch with the connections for switch S881 etc. to the upper left part of the stand, across the upper part of the stand and then down on the right.
- Route the branch with the connector for D806 on the lifting carriage as shown in 1/ Fig. 3 and secure it with cable ties.

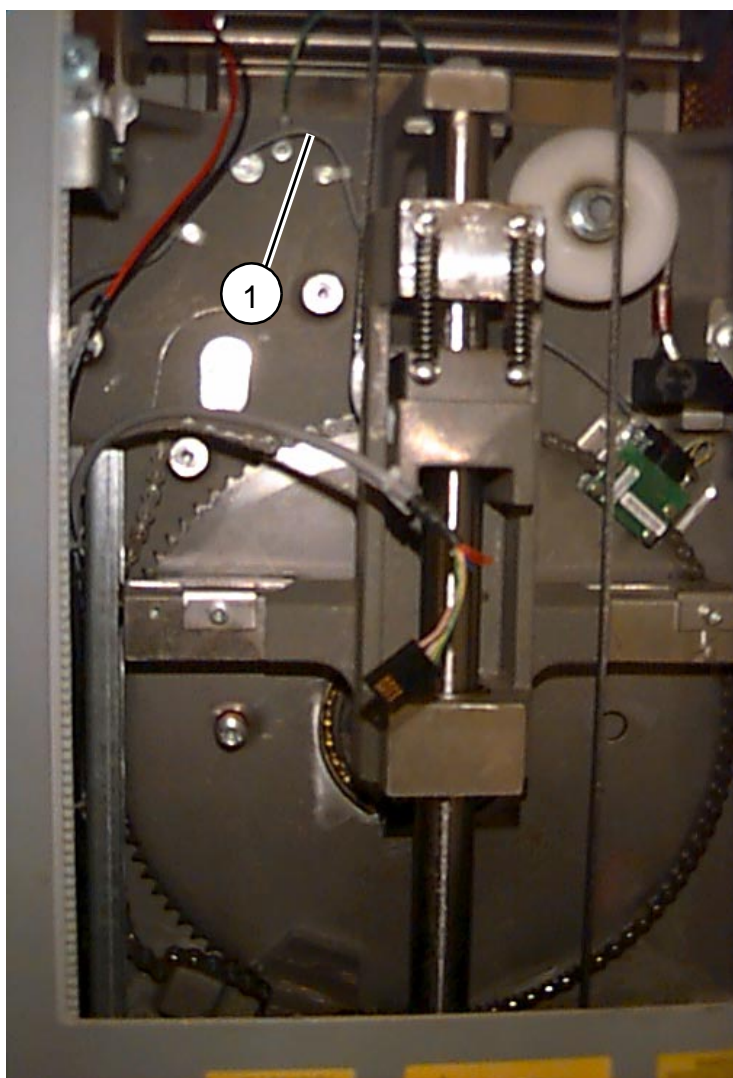
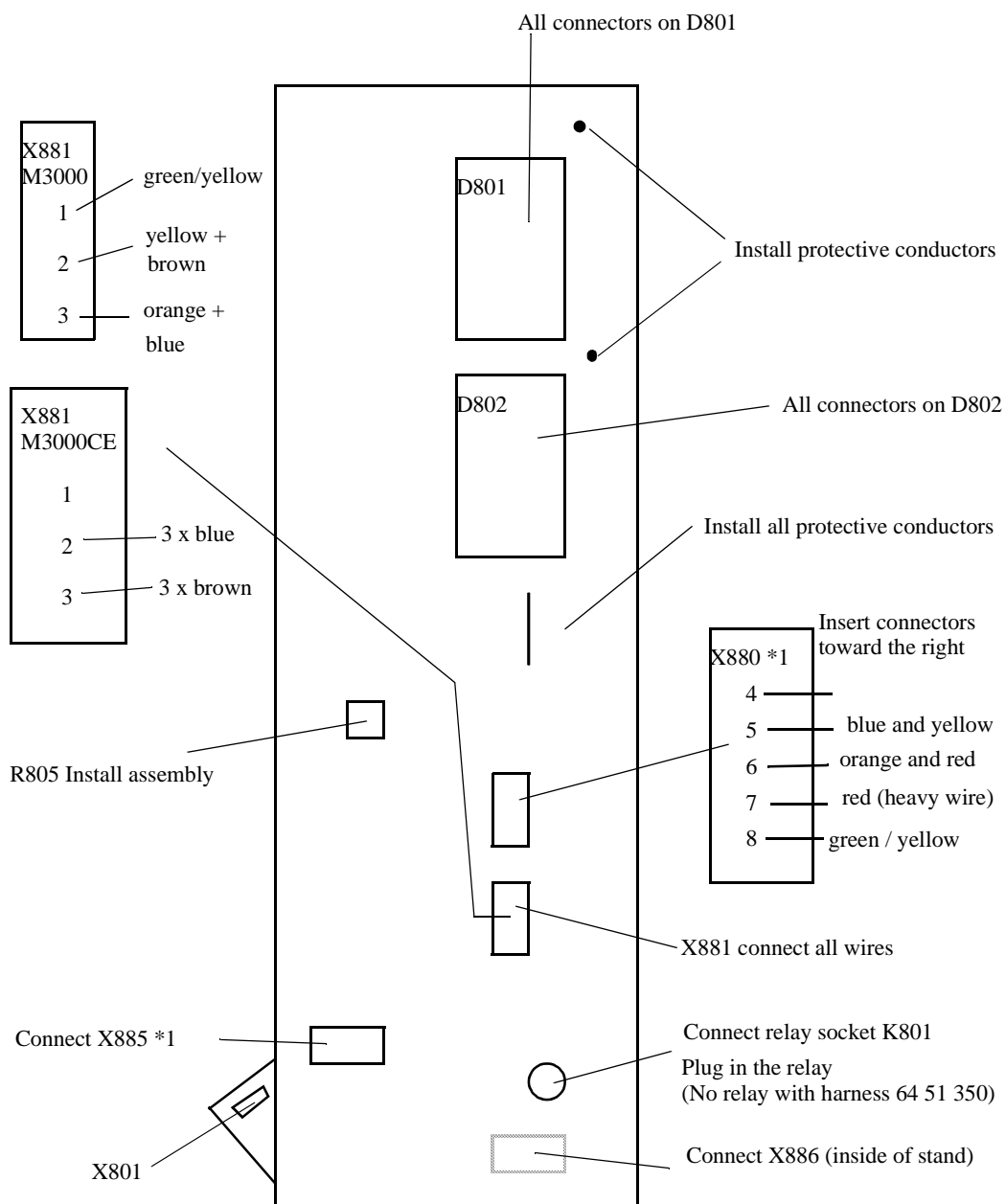


Fig. 3

Connecting the cable harness to the left side of the stand



*1 not for MAMMOMAT 3000 CE

Fig. 4

NOTICE

Some connections may not be present on MAMMOMAT 300 / MAMMOMAT 300 CE.

On MAMMOMAT 3000 CE: Plug X802 into the receptacle in the stand.

Connecting the cable harness to the back wall of the stand

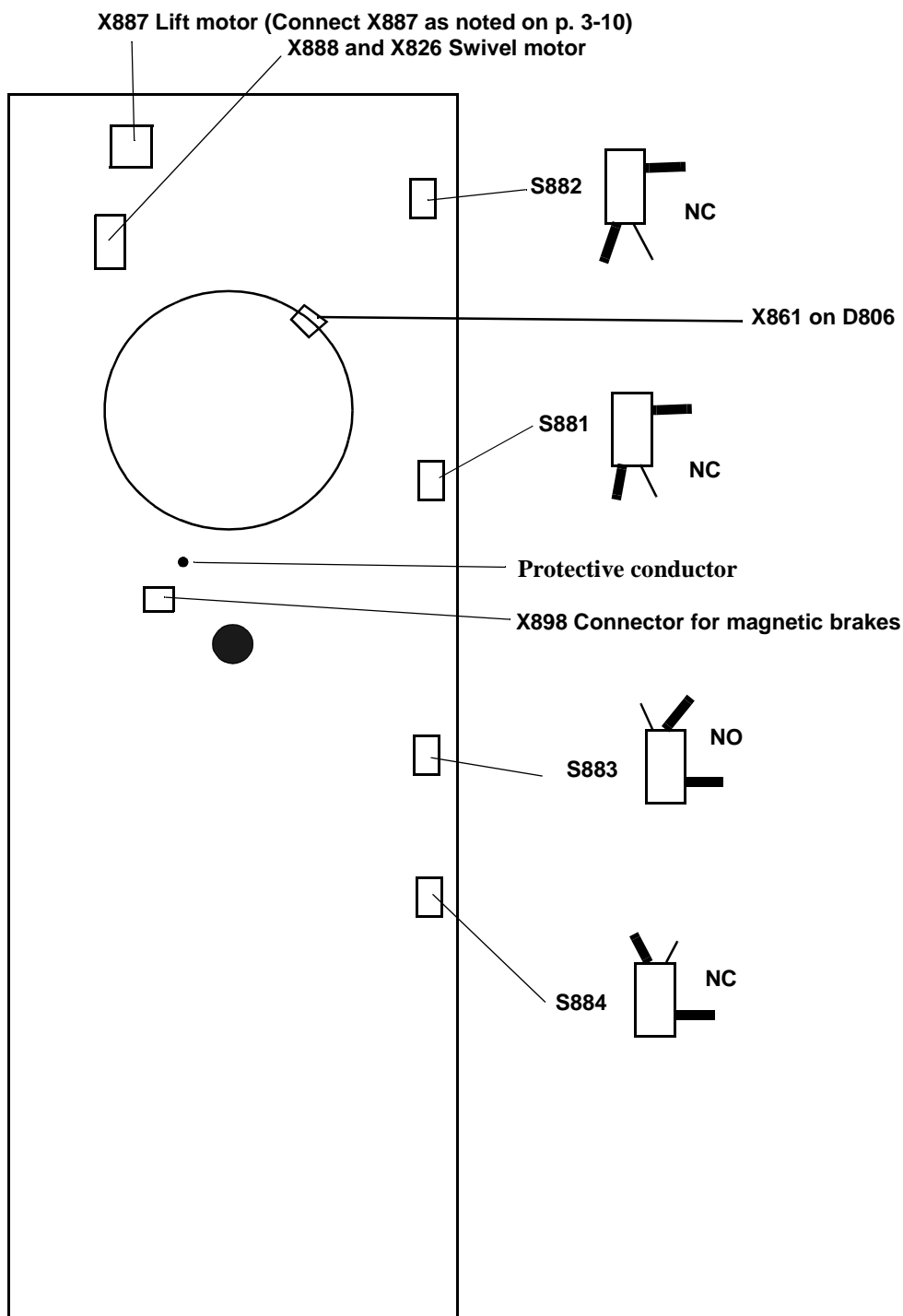


Fig. 5

If the swivel motor has been removed

- Install the swivel motor.
- Remove the transport screw for the rotation counterbalance (see p3-11).
- Attach the cable bracket to the base of the stand (1/Fig. 6).

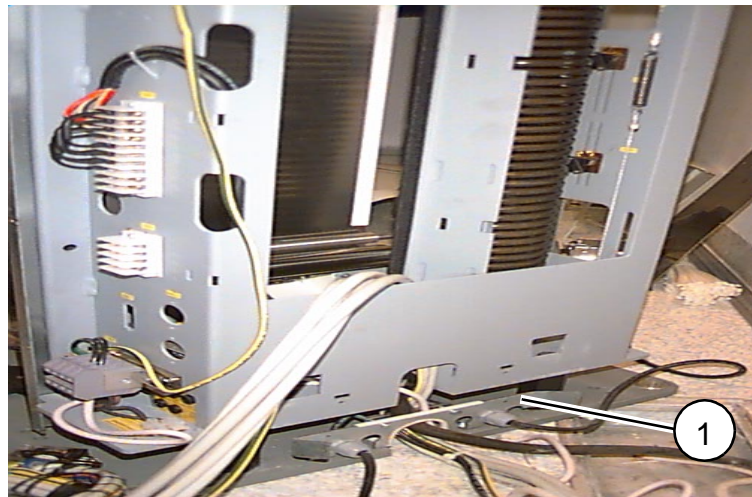


Fig. 6

MAMMOMAT 300 CE / MAMMOMAT 3000CE only

Connect the wires on the multi-purpose connection device in the stand:

- Attach plug X885 using the screws and connect the wires to the stereo evaluation unit (if used).
- Connect the wires to line filter Z801.
- Connect the protective conductor (inside)
- Connect the wire to the inside of connector X803

X803	1	2	3	4
	blue yellow	red orange	blue (heavy wire)	open

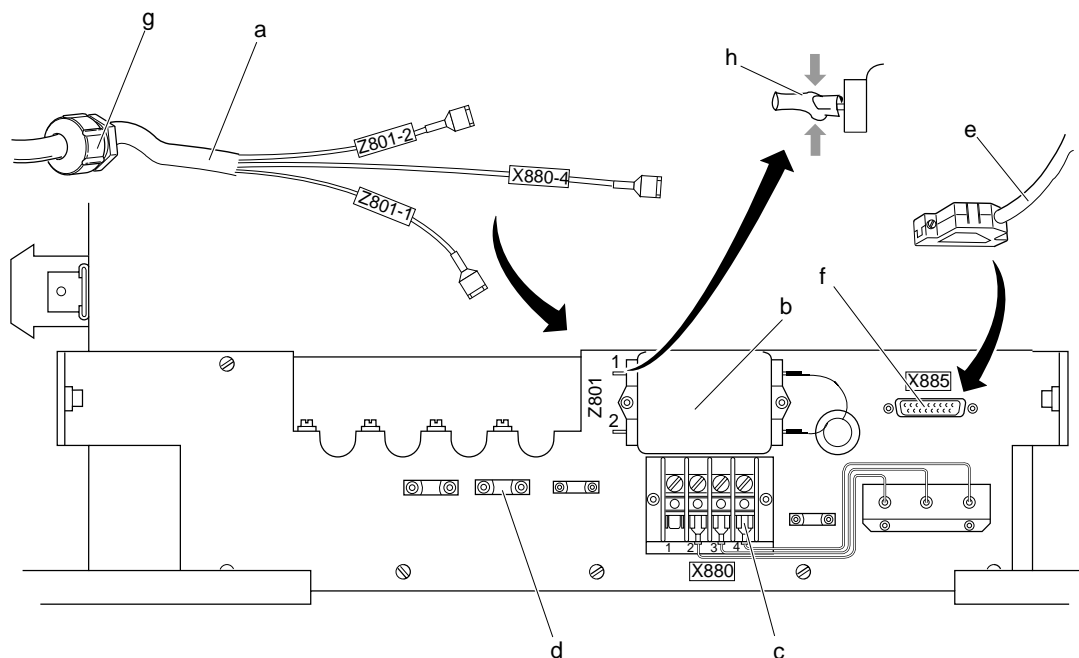
- Reconnect the wires to the generator with the strain relief. Ensure that the braided shielding is correctly installed.

- Secure the angle bracket (2) to the corrugated hose with the screws.

MAMMOMAT 300 CE / MAMMOMAT 3000 CE only

NOTICE

Make sure that the shielding is folded over the lead-through ring and that the semicircular cable clamp is in position. Also make sure that the braided grounding wire is between the hose clamp and the shielding.



95550081

Fig. 7



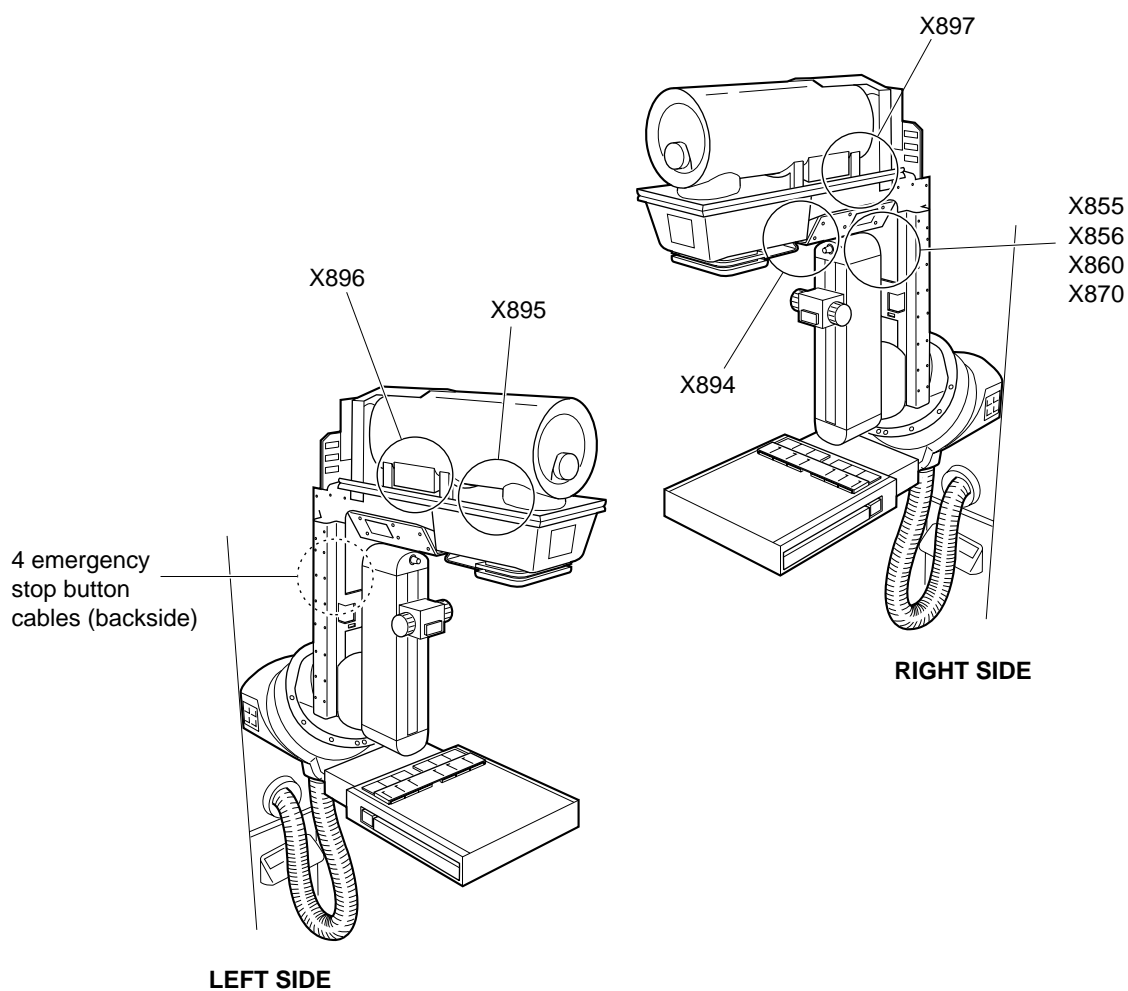
Fig. 8

MAMMOMAT 300/ CE

- Insert the cable harness in the swivel arm.
- Reattach the table support with the screws.

NOTICE

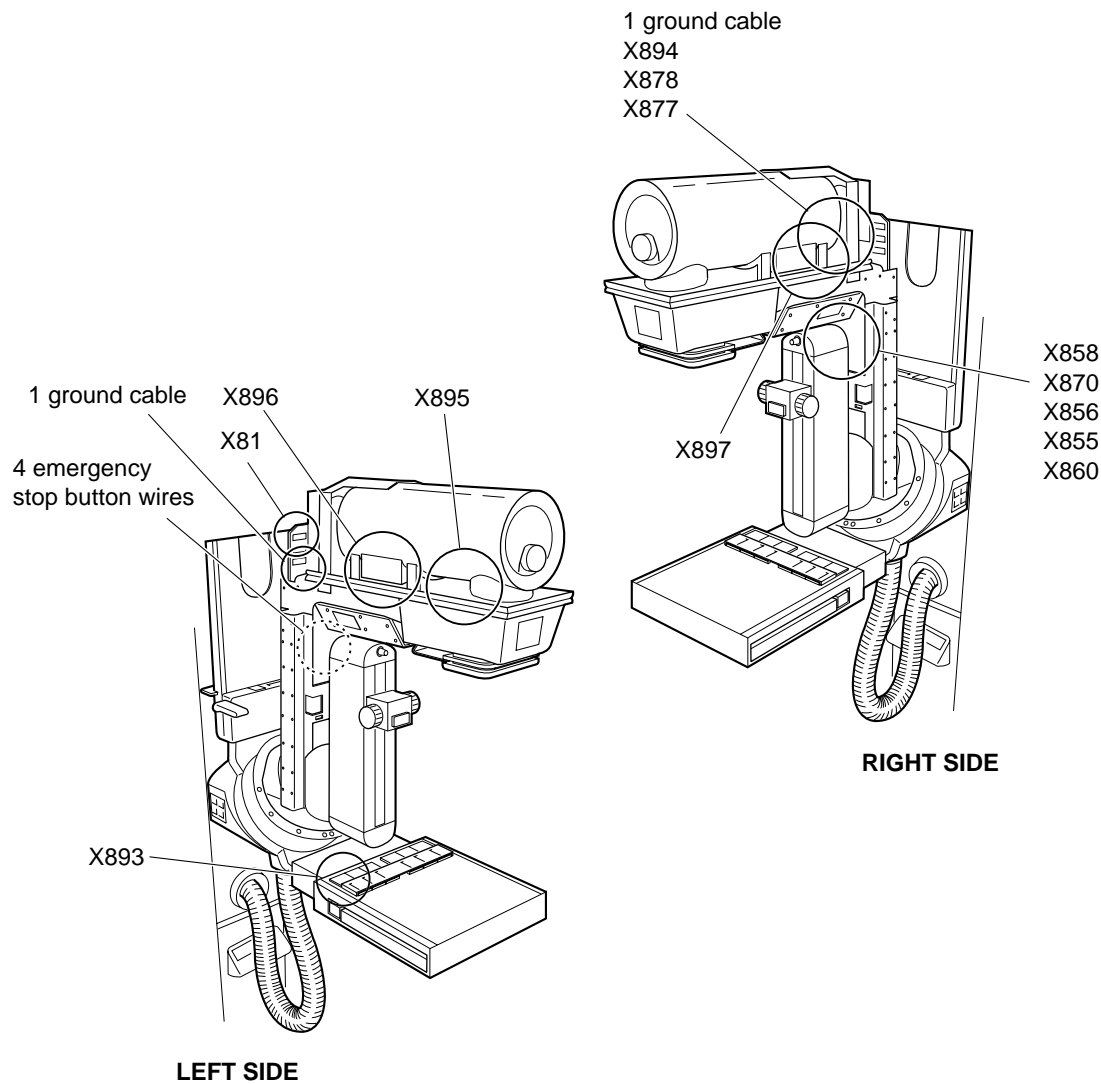
Make sure that the shielding is folded over the lead-through ring and that the semicircular cable clamp is in position. Also make sure that the braided grounding wire is between the hose clamp and the shielding.



MAMM00237

Fig. 9

MAMMOMAT 3000/ CE



MAM00228

Fig. 10

- Place the lead-through ring over the corrugated hose.
- Attach the lead-through ring with the screws.

NOTICE

Make sure that the shielding is folded over the lead-through ring and that the semicircular cable clamp is in position. Also make sure that the braided grounding wire is between the hose clamp and the shielding.

- Install the stereo switch with the screws.

MAMMOMAT 300/ CE

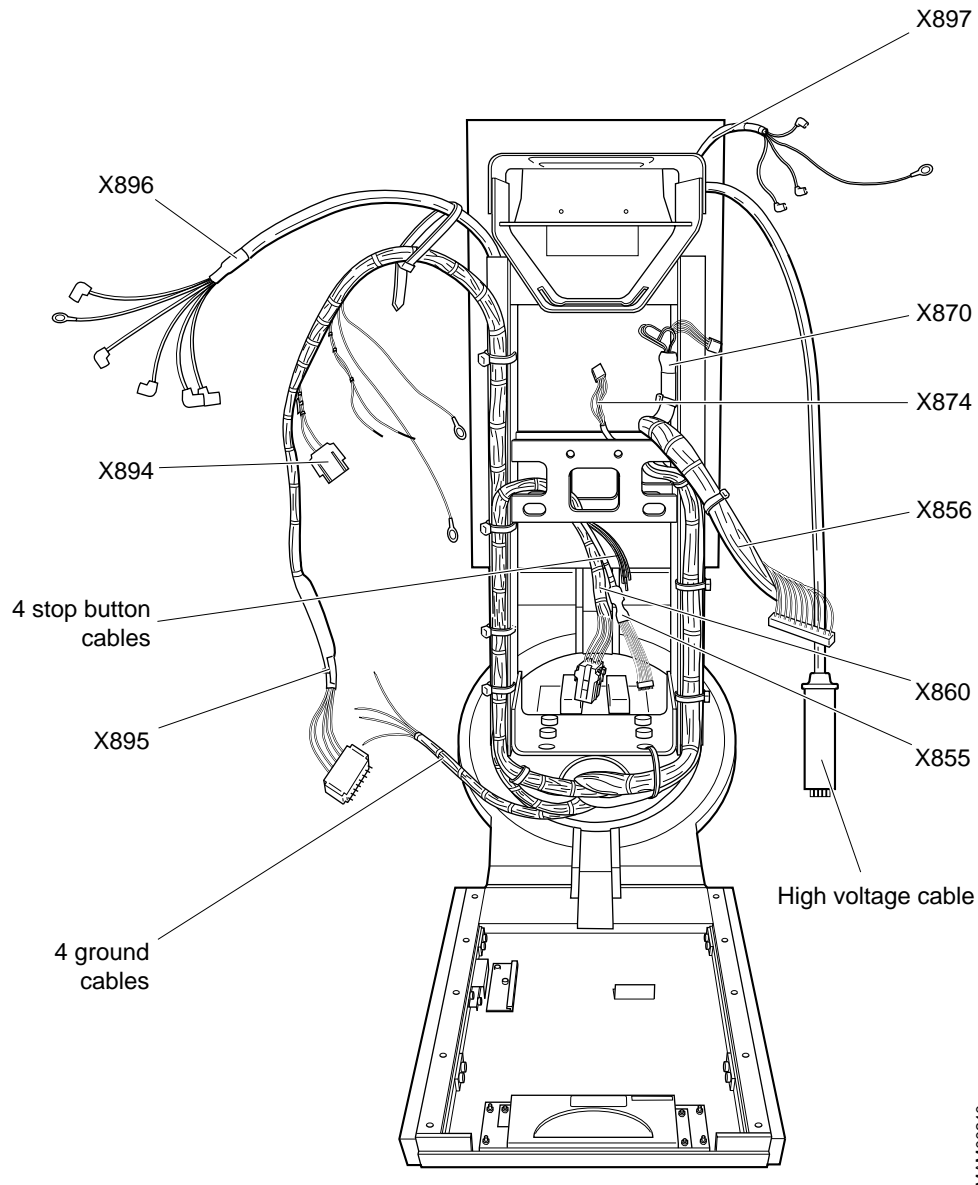
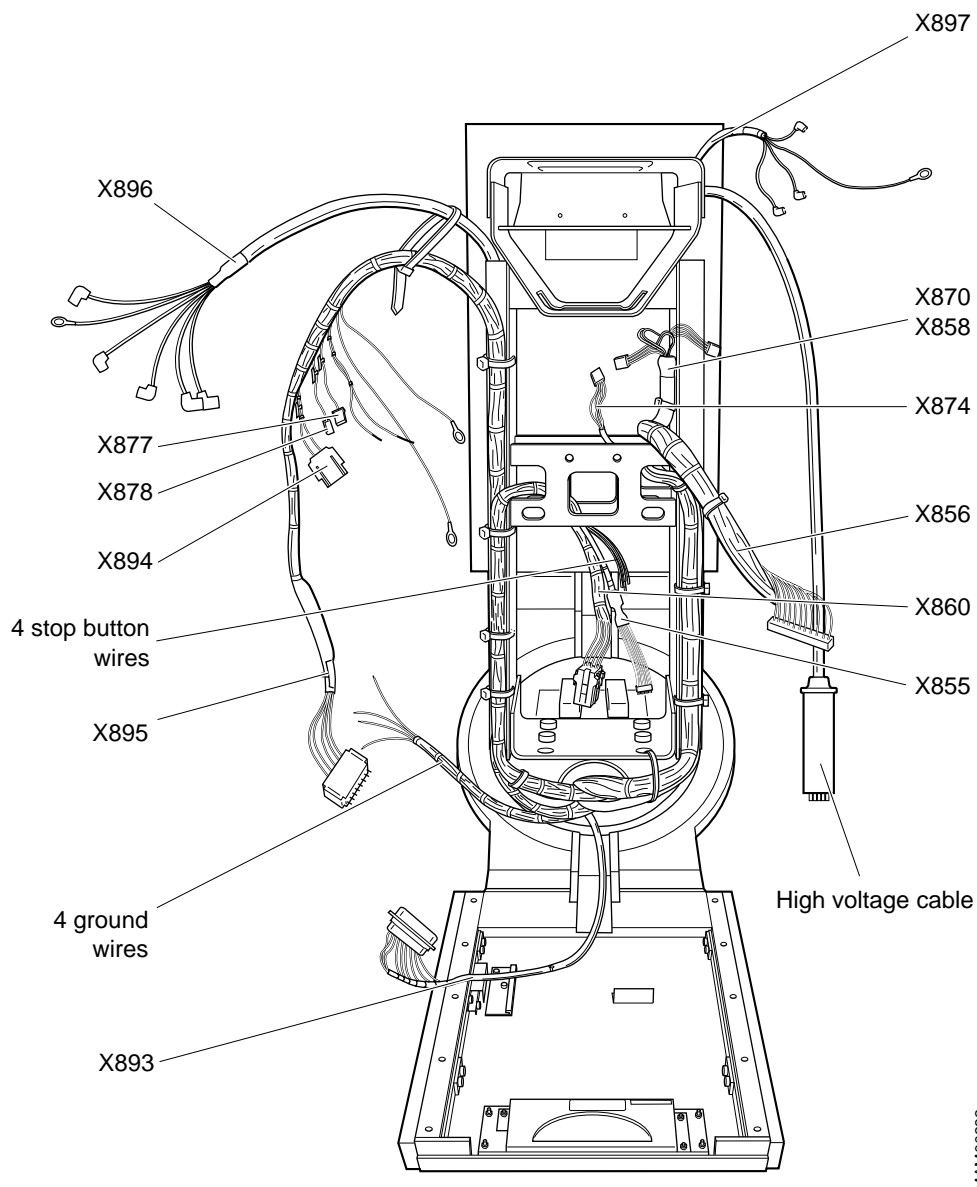


Fig. 11

- Divide the cable harness and insert it. Route the cable harness so that it is free of coils and kinks.
- Secure the cable harness with cable ties.

Mammomat 3000/ CE



MAM00232

X896 (X-ray tube)	G	H3	H1M	H2M	H1W	H2W
Wire	G	0	1	2	3	no designation

Fig. 12

- Divide the cable harness and insert it. Route the cable harness so that it is free of coils and kinks.
- Secure the cable with cable ties.
- Reinsert wire 2 into connector X860.
- Insert all cables as shown in the Fig. and connect as many plugs as possible at this point.

-

MAM00233

Diagram illustrating the wiring connections for a 4-wire terminal block. The terminal block is shown with four terminals labeled 1, 2, 3, and 4. The corresponding wire colors and labels are:

- Blue (BU) - Terminal 1
- White (WH) - Terminal 2
- Yellow (YE) - Terminal 3
- Black (BK) - Terminal 4

MAM00234

STOP switch connections	Connection no.
white (WH)	11
blue (BU)	12
black (BK)	21
yellow (YE)	22

MAMMOMAT 300 / 3000

- Secure the cable with cable ties.
- In the WING: install the harness securely with screw-mounted cable ties.

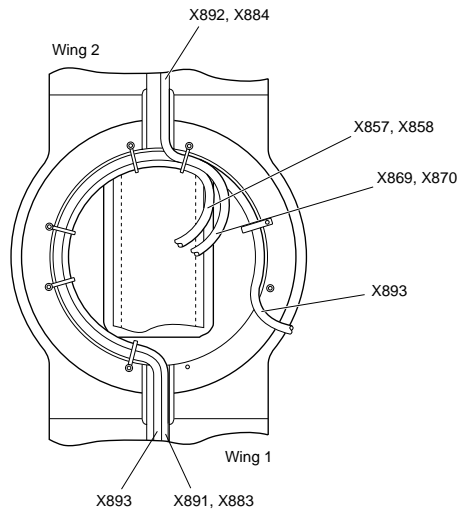


Fig. 16

Routing the cable in the swivel arm

- Install and connect the fan.
- Install the compression unit and secure it with screw #3 (refer to Fig. 2-5) (do not tighten the screw yet).
- Tilt the compression unit slightly forward.
- Install connectors X872, X873 and X874.

CAUTION

Ensure that X874 does not collide with the measurement device for stereo positioning (light barriers for measuring the $\pm 10^\circ$ tilt of the tube.)

- Reinstall the rubber bellows over WING 1 / WING 2 (refer to Pos. 7 in Fig. 2 - 8) with the screws.

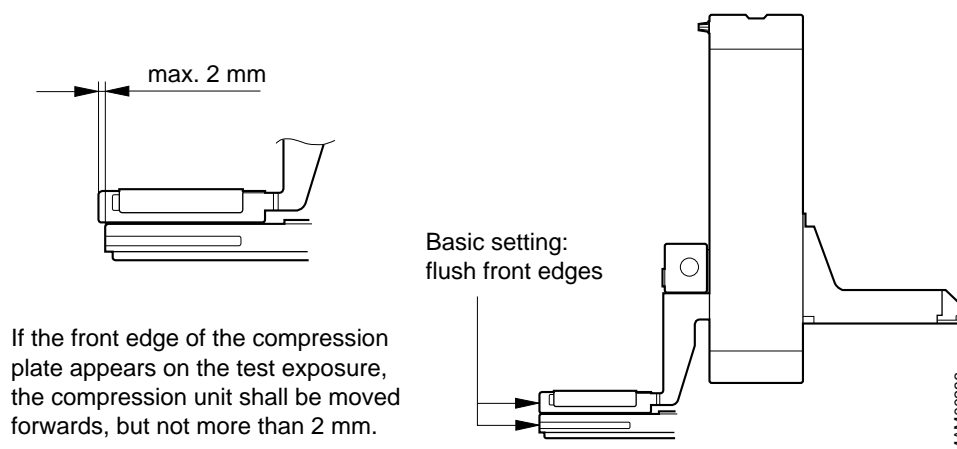


Fig. 17

Correct positioning of the compression unit

- Tighten the compression unit with the 3 screws.
Make sure to position it correctly.
- Reconnect the protective conductors and the cable guide to the compression unit.
- Check all system movements (compression, "flying wing", tube rotation, etc.)
Make sure that all cables are routed correctly.
- Take a test exposure.
Check that the radiation field is correctly positioned.
- If the front edge of the compression cone is visible in the exposure, the position of the compression unit must be adjusted. However, the unit must not extend more than 2 mm. (Refer to the Fig. 17).
- Measure the protective earth resistance ($< 0,1 \text{ ohm}$) with the protective conductor meter between the earth connection on X899 (stand mains connection) and:
 - Compression unit base beam
 - Table support cover(s)
 - X-ray tube
 - Generator chassis
- Attach all the covers (except the generator cover).
- Check the system functions according to the adjustment instructions (e.g. kV measurement, Iontomat test on both wings if fitted etc.).
- Attach the generator cover.

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Chapter	Pages	
1	1-1	Changed item no
2	2-1	Inserted new figure
	2-2	New page! New stand cover version
	2-3	Changes due to new numbering order
	2-4	First point deleted, see 2-3 below
	2-5	Inserted NOTICE, see 2-4 above. Plus changed text in list
	2-6	Text changed, see 2-5 above
	2-7	Changed text in list, see 2-6 above
	2-8	New page
3	3-3	Text in table changed
	3-4	Changed text
	3-5	Inserted NOTICE for CE version
	3-7	Text inserted in fig.
	3-8	Text inserted in fig.
	3-9	Text changed
	3-10	Text inserted and changed in fig.
	3-14	Text changed
	3-16	Text changed
4	4-3	Text inserted and changed in fig.
	4-4	Text inserted and changed in fig.
	4-5	Text changed
	4-6	Text in NOTICE changed
	4-7	Text in NOTICE changed
	4-8	Text in NOTICE changed
	4-11	Text changed
	4-12	Text changed
	4-13	Text changed
5	5-1	New

TD HSC 24 / Guggenmos

TD SD 24 / Gross

SMS Iselin / O'Donnell

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